



**PUBLIC HEALTH INFORMATION NETWORK
(PHIN)
REQUIREMENTS VERSION 2.0**

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Foreword

The Public Health Information Network (PHIN) is the Centers' for Disease Control and Prevention (CDC) vision for using nation-wide interoperable information systems to support public health at the national, state, territorial, and local levels.

In April 2005, CDC released the original PHIN Functional Requirements. These original requirements focused on public health preparedness and were developed to facilitate the implementation and certification of state and local health department information systems for supporting responses to “intentional acts of terrorism or naturally occurring disease outbreaks.”¹ The emphasis on public health preparedness was driven by the immediate need to upgrade the nation's public health capacity to respond to emergency events.

Since the initial release in 2005, public health agencies at all levels of government have been working to develop PHIN compliant information systems to support emergency response activities. Much has been learned as a result of these efforts even as the national landscape for public health and health information technology has continued to evolve. Since the inception of PHIN, the Office of the National Coordinator for Health Information Technology (ONC) at the Department of Health and Human Services and the federal advisory committee, the American Health Information Community (AHIC) were created. These new entities have facilitated significant momentum toward the successful development of a Nationwide Health Information Network (NHIN).

Recently, the broad charge to one of the workgroups of AHIC, the Population Health and Clinical Care Connections workgroup (formerly Biosurveillance), has expanded its scope and is now making recommendations to the community (AHIC) that facilitate the flow of reliable health information among population health and clinical care systems necessary to protect and improve the public's health. Given these overarching national healthcare technology initiatives, PHIN must mature and evolve to achieve a high level of harmonization with the developing NHIN. Significant input from the public health community involved in PHIN is crucial to assure this harmonization.

With all of this in mind, CDC undertook a collaborative process in 2006 to assess and retool the PHIN requirements. The collaborative process included a series of workgroups comprised of state and local public health agency representatives and national partner organizations. Working with the guidance and advice of these workgroups, CDC has rewritten and reorganized the previously published requirements. In doing so, we:

- focus the requirements on exchanging, communicating and protecting data using electronic information systems
- describe how information systems support typical public health activities beyond emergency preparedness and response
- identify the applicable standards and guidelines for the requirements to assist in implementing interoperable information systems.

¹ CDC. PHIN's Impact on Public Health. Available from <http://www.cdc.gov/phn/overview.html> [cited 2006 Aug 12].

PHIN Requirements Version 2.0 govern the exchange of data, a public health directory, and the availability and security of electronic information system(s). In addition to the PHIN Requirements, this document contains appendices that identify the standards and guidelines related to the requirements and a glossary of terms used in the requirements.

PHIN Requirements will evolve, as necessary, to maintain alignment with the national public health initiatives, support the implementation of PHIN, accommodate advances in informatics and technologies, and incorporate newly adopted standards or revisions to existing standards. CDC will work with partners to provide additional information over time to assist with and support implementation of these requirements including:

- criteria by which these requirements will be certified
- message specification guides
- message mapping guides
- implementation guides

PHIN Requirements

This section describes requirements for electronic information systems to support interoperability between various public health partners. PHIN requirements use sound informatics principles to help ensure an ability to effectively and efficiently move all levels of public health forward with minimal impact.

PHIN REQUIREMENTS: FUNCTIONS OF ELECTRONIC INFORMATION SYSTEMS

CDC requires that each state or local health department—or its agent—

- 1 be able to compose electronic messages using standard protocols, formats, and terminologies.
 - 1.1 be able to identify, extract, and compile the data elements required for a specified message from existing data sets or documents.
 - 1.2 be able to convert data content stored in non-standard formats or terminologies into standard formats and terminologies that are current.
 - 1.3 be able to construct messages from standardized data content using specified messaging standards.

CDC requires that each state or local health department—or its agent—

- 2 be able to securely send to one or more recipients electronic messages composed using standard protocols, formats and terminologies.
 - 2.1 uniquely identify the sending and receiving parties within the message.
 - 2.2 verify that the receiving systems and parties are trusted.
 - 2.3 be able to request a message acknowledgement
 - 2.4 be able to respond to a notification from a recipient that an error was encountered during the processing or interpreting of a message.

CDC requires that each state or local health department—or its agent—

- 3 be able to securely receive, process, and interpret electronic messages sent using standard protocols, formats, and terminologies.
 - 3.1 verify that the sending systems and parties are trusted.
 - 3.2 be able to process and interpret received messages and, as appropriate, store their content in locally maintained datasets.
 - 3.3 be able to send acknowledgement of message receipt when requested.
 - 3.4 be able to send a notification indicating that an error was encountered during the processing or interpreting of a message.

CDC requires that each state or local health department—or its agent—

- 4 be able to electronically enter, edit, and retrieve identifying and other information about persons, organizations, or other entities from an electronic directory that adheres to standard directory protocols, formats, and terminologies, and to which the department has authorized access.

CDC requires that each state or local health department—or its agent—

- 5 ensure that its electronic information systems that support PHIN requirements are secure and have the appropriate level of availability and the information contained is only accessed or used by authorized users for authorized purposes.
 - 5.1 have an Internet connection available to support data exchange and PHIN interoperability initiatives.
 - 5.2 implement administrative and physical safeguards that conform to current standards to prevent unauthorized access to, and use of, its information systems.
 - 5.3 identify persons and other electronic information systems authorized to access its electronic information systems.
 - 5.4 provide system access to authorized senders that conforms to current standards for securely exchanging messages and data.
 - 5.5 maintain a record of all persons and electronic devices that access its electronic information systems and the actions taken during such access.

Appendices

Appendix A: PHIN Requirements - Standards

The following standards have been identified by PHIN for use when implementing information systems to fulfill the PHIN requirements defined in this document. The standards must be draft or published documents authored by standards development organizations. The PHIN Requirements that the standard supports and applies to are listed in the column labeled “Applies to Requirement(s)”.

Standard	Applies to PHIN Requirement(s)
<i>PHIN Message Standard(s)</i>	
Health Level Seven (HL7) - See specific message implementation guide for message type and version information	1, 3
<i>PHIN Directory Exchange</i> <ul style="list-style-type: none"> •Directory Services Markup Language v1.0 (DSMLv1) (Additional information available from: http://www.oasis-open.org/specs/index.php). 	4
<i>PHIN Partner Communications and Alerting - Cascade Messaging</i> <ul style="list-style-type: none"> •Emergency Data Exchange Language (EDXL) V 1.0 Distribution Element EDXL •Common Alerting Protocol (CAP) V 1.1 	1, 3
<i>PHIN Secure Messaging Standard(s)</i>	
ebXML Messaging Specification (ebMS) version 2.0 (Messages must comply with ebMS v2.0)	2, 3, 5
HTTPs (All messaging is carried over HTTPs)	2, 3, 5
SSL (Used for Client Authentication)	2, 3, 5
XML Encryption (Message payloads are to be encrypted compliant with XML Encryption – More information on XML Encryption is available at http://www.w3.org/TR/xml-encryption-req).	2, 3
XML Digital Signature (Messages may be digitally signed using XML Digital Signature)	2, 3
<i>PHIN System Security and Availability Standard(s)</i>	
<i>National Institute of Standards and Technology (NIST) Information Technology Standards</i> <ul style="list-style-type: none"> • Minimum Security Requirements for Federal Information and Information Systems FIPS Publication 200. (Available from: http://csrc.nist.gov/publications/nistpubs/index.html) 	5

Appendix B: PHIN Requirements - Guidelines

The following guidelines have been identified by PHIN for use when implementing information systems to fulfill the PHIN requirements defined in this document. The guidelines must be documents authored or endorsed by CDC providing guidance about how to accomplish PHIN related activities. The PHIN Requirements that the guideline supports and applies to are listed in the column labeled “Applies to Requirement(s)”.

Guideline	Applies to PHIN Requirement(s)
PHIN Message Implementation Guides Available at: http://www.cdc.gov/phn/resources/guides.html	
Notification	
PHIN Varicella Case Notification 1.0 (HL7 ORU^R01, HL7 Version 2.5) [pdf]	1, 3
PHIN Tuberculosis Case Notification 1.0 (HL7 ORU^R01, HL7 Version 2.5) [pdf]	
PHIN Electronic Laboratory Reporting with HL7 2.5.1 Draft (HL7 ORU^R01, HL7 Version 2.5.1) [pdf]	
Laboratory	
PHIN Laboratory Test Order (HL7 Message OML^021 HL7 Version 2.5) [pdf]	1, 3
PHIN Laboratory Test Order Response (HL7 Message ORL^022 HL7 Version 2.5) [pdf]	
PHIN Laboratory Result – Generic (HL7 Message OUL^R22 HL7 Version 2.5) [pdf]	
PHIN Laboratory Result – Biological Agent (HL7 Message OUL^R22 HL7 Version 2.5) [pdf]	
PHIN Laboratory Result – ELR (HL7 Message ORU^R01 HL7 Version 2.3.1) [pdf]	
Healthcare Related	
PHIN Laboratory, Pharmacy and Supply Orders (HL7 Message ORM^O01 HL7 Version 2.3.1) [pdf]	1, 3
PHIN Healthcare Encounter – Chief Complaint (HL7 Message ADT^A04 HL7 Version 2.5) [pdf]	
PHIN Healthcare Encounter – Diagnosis (HL7 Message ORU^R01 HL7 Version 2.3.1) [pdf]	
Response	
PHIN Countermeasure Administration – Substance Administration (HL7 Message RAS^O17 HL7 Version 2.5) [pdf]	1, 3
PHIN Countermeasure Administration – Follow-up (HL7 Message ORU^R01 HL7 Version 2.5) [pdf]	
PHIN Countermeasure Administration – Other Treatment Orders (HL7 Message ORU^R01 HL7 Version 2.5) [pdf]	
PHIN Countermeasure Administration – Referral (HL7 Message REF^I12 HL7 Version 2.5) [pdf]	

Guideline	Applies to PHIN Requirement(s)
PHIN Countermeasure Administration – Adverse Event (HL7 Message ORU^R01 HL7 Version 2.5) [pdf]	
<i>PHIN Directory Exchange Implementation Guide</i>	
PHIN Directory Exchange (DSML v1.0)	4
<i>PHIN Partner Communications and Alerting Guide</i>	
PHIN Partner Communications and Alerting Guide (CAP v1.1) (EDXL v1.0)	1, 3
<i>Specifications for the STD case report message format</i>	
CDC STD Program <ul style="list-style-type: none"> • NETSS Implementation Plan – specifications for the STD case report message format. 	1, 3
<i>Cancer Registries Record layout/specifications</i>	
The North American Association of Central Cancer Registries <ul style="list-style-type: none"> • Data Exchange Standards and Record Description - Record layout/specifications for data exchange, includes correction and analysis formats 	1, 3

Appendix C: Glossary

access

Definition: “obtain, examine, or retrieve (data or a file)” (*Source:* OAD)

acknowledgement

Definition: a message from the addressee [recipient] informing the originator [sender] that the originator's [sender's] communication has been received [[and understood]] (*Source:* Adapted from Wiktionary)

appropriate level of availability

Definition: systems that are able to be used within a suitable timeframe based on the criticality of the services or programs supported by the system

Example or Comment: A public health jurisdiction would consider the system availability requirements to support emergency response, as well as, other national, state, local or program level requirements and priorities to determine the appropriate level of availability to target for its electronic information systems. For example, systems supporting critical functions, like emergency response, might require an availability level of 7x24x365, while systems supporting routine functionality might require an availability level of 8-5 M-F.

authorize

Definition: “give official permission for or approval to (an undertaking or agent)” (*Source:* OAD)

available

Definition: “able to be used or obtained” (*Source:* OAD)

compile

Definition: produce something by assembling information [or data] from various sources (*Source:* OAD)

compose

Definition: “order or arrange (parts) to form a whole” (*Source:* OAD)

data

Definition: 1. “facts and statistics gathered together for reference or analysis” 2. “the quantities, characters, or symbols on which operations are performed by a computer, being stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media” (*Source:* OAD)

data elements

Definition: “a unit of data for which the definition, identification, representation and permissible values are specified by means of a set of attributes” (*Source:* ISO 11179)

data set

Definition: a defined group of data elements (*Source:* Adapted from METeOR manual)

Example or Comment: A data set specification can define the sequence in which data elements are included, whether they are mandatory, what verification rules should be employed, and the characteristics of the collection (e.g., its scope).

edit

Definition: change or adapt so as to make suitable or acceptable

electronic

Definition: “relating to or carried out using a computer or other electronic device” (Source: OAD)

electronic device

Definition: a piece of equipment that is capable of transmitting, intercepting, retrieving or exchanging information with any part of an electronic information system

Example or Comment: Electronic devices include but are not limited to portable and desk-top computers, telephones, smart-phones, personal digital assistants, digital camera.

electronic directory

Definition: a listing of individuals or organizations alphabetically or thematically with details such as names, addresses, and telephone numbers that is maintained using a computer or other electronic device (Source: Adapted from OAD definition of directory and electronic)

electronic message

Definition: a communication recorded or generated using a computer or other electronic device and to be sent to a recipient by electronic means. (Source: Adapted from OAD definitions for electronic and message)

Example or Comment: Primary method adopted by PHIN to exchange data between public health partners and jurisdictions.

enter

Definition: “write or key (information) in a book, computer, etc., so as to record it” (Source: OAD)

extract

Definition: select, obtain, or derive from a body of information (Source: Adapted from OAD)

format

Definition: “a defined structure for the processing, storage, or display of data” (Source: OAD)

identify

Definition: “recognize or distinguish” (Source: OAD, Encyclopedia of Public Health)

Example or Comment: The purpose of public health surveillance is to identify, characterize, and monitor events or conditions of public health importance. Public health surveillance is the ongoing, systematic use of routinely collected health data to guide public health action in a timely fashion. Surveillance systems count health events (e.g. deaths from a disease or new cases of a disease) and health services (e.g. visits to a doctor, hospital admissions, vaccination, surgery, provision of prescription drugs) as they occur. Some systems collect information on risk factors related to various diseases, including foods, water supply, drug use, and travel, while other systems measure health behaviors (e.g. smoking, alcohol and drug use, nutrition) and environmental factors (e.g. air, food, or water quality) independently of any health events associated with them.

information system

Definition: “a system, whether automated or manual, that comprises people, machines, or methods organized to collect, process, transmit, and disseminate data” (Source: Wikipedia)

internet connection

Definition: a means of linking a computer, computer network, or electronic information system to the Internet

interpret

Definition: understand the meaning of information, words, or actions (Source: Adapted from OAD)

locally

Definition: belonging to, relating to, or residing within a particular area or organization (Source: Adapted from OAD)

messaging standard

Definition: a standard for composing and exchanging electronic messages

non-standard format

Definition: a format that does not follow or adhere to established standards

non-standard terminology

Definition: a terminology that does not follow or adhere to established standards

process

Definition: carry out operations on data by means of a computer program (Source: Adapted from OAD)

process electronic message

Definition: carry out operations on an electronic communication by means of a computer program

protocol

Definition: “a set of rules governing the exchange or transmission of data electronically between devices” (Source: OAD)

Example or Comment: The hypertext transfer protocol (http) is a set of rules for transferring data on the World Wide Web.

received

Definition: taking or accepting something given (Source: Encarta)

secure

Definition: “not subject to threat; certain to remain or continue safe or unharmed” (Source: OAD)

standard

Definition: [1] “documented agreements containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics, to ensure that materials, products, processes, and services are fit for their purpose” , [2] a draft or published document authored by a recognized standards development organization that presents a set of rules, conditions, or requirements (Source: [1] ISO, 2002, [2] CDC)

Example or Comment: Examples include HL7 version 2.5 and ISO 11179. In contrast, a guideline is a “CDC authored or endorsed "how to" document.”

standardize data

Definition: process of removing variations and irregularities in data so it adheres to established standards

system access

Definition: the right, ability, or opportunity to obtain, examine, or retrieve (data or a file) from an (electronic) information system (Source: Adapted from OAD definition for access (noun))

trusted

Definition: reliable, authentic, deserving of confidence (Source: Adapted from OAD and Wiktionary)

unauthorized access

Definition: obtaining, examining, or retrieving (data or a file) from an (electronic) information system without official permission or approval (*Source:* Adapted from definitions for authorized and access)

uniquely identify

Definition: a means of designating an entity so that it can be distinguished from all other entities of its own type or of different types

Example or Comment: Object identifiers (OID) provide a system for uniquely identifying entities. Social security numbers are sometimes used to uniquely identify persons in the United States, although there limitations to their use for this purpose.

verify

Definition: “make sure or demonstrate that (something) is true, accurate, or justified” (*Source:* OAD)

REFERENCES:

- Encarta® World English Dictionary [North American Edition] © & (P) 1998-2003 Microsoft Corporation. All rights reserved. Developed for Microsoft by Bloomsbury Publishing Plc.
- Encyclopedia of Public Health, Lester Breslow (Editor): Macmillan Reference USA, 2002.
- ISO. International Organization for Standardization [home page on the Internet]. Geneva: International Organization for Standardization; [cited 2002 May 22]. ISO Introduction; [about 20 screens]. Available from: <http://www.iso.ch/iso/en/aboutiso/introduction/index.html>.
- ISO 11179. International Organization for Standardization. Metadata registries, second edition. Part 1: Framework. Geneva: International Organization for Standardization; 2004. Available from: <http://metadata-standards.org/11179/index.html#11179-1> [cited 2007 Jan 27].
- METeOR manual. Australian Institute for Health and Welfare. METeOR User training manual, version 1.2., pages 9-11. Available from: <http://meteor.aihw.gov.au/content/index.phtml/itemId/293055?refreshCache=1> [cited 2007 Jan 26].
- NIST handbook. National Institute of Standards and Technology, An Introduction to Computer Security: The NIST Handbook. Special Publication 800-12. Available from: csrc.nist.gov/publications/nistpubs/800-12/handbook.pdf [cited 2007 Jan 26].
- OAD. New Oxford American Dictionary, Second Edition, Erin McKean (Editor), New York: Oxford University Press, May 2005.
- Wikipedia: the free encyclopedia. Available from: http://en.wikipedia.org/wiki/Main_Page [Cited 2007 Jan 27].
- Wiktionary: a wiki-based open content dictionary. Available from: http://en.wiktionary.org/wiki/Main_Page [Cited 2007 Jan 27].
- WordNet: an electronic lexical database. Princeton University, 2006. Available from: <http://wordnet.princeton.edu/> [Cited 2007 Jan 27].